PERFORMANCE SPECIFICATION SHEET

CABLE, FIBER OPTIC, ONE TUBE, BLOWN OPTICAL FIBER, STANDARD AND ENHANCED PERFORMANCE, CABLE CONFIGURATION TYPE 5 (TUBE), APPLICATION B (SHIPBOARD), CABLE CLASS SM AND MM, (METRIC)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification and MIL-PRF-85045.

CLASSIFICATION:

Fiber optic cable configuration type (Tube): 5.

Fiber cable class: MM (graded-index, glass core and glass cladding, multimode).
SM (dispersion-unshifted, glass core and glass cladding, single mode).

DESIGN AND CONSTRUCTION:

Blown optical fiber tube:

Dimensions and configuration: See figure 1.

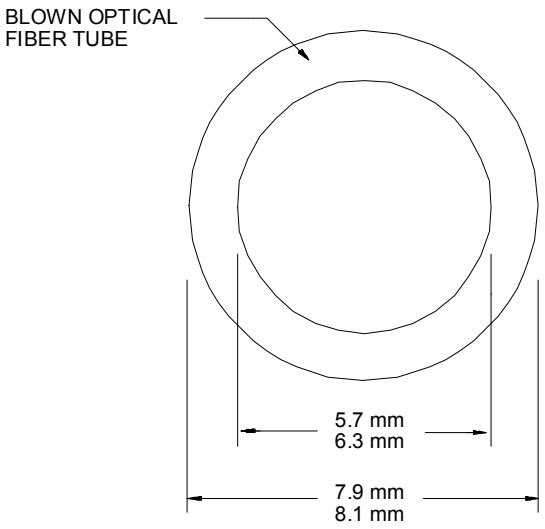

FIGURE 1. Blown optical fiber tube.

Short-term minimum bend diameter: 127 mm.

Long term minimum bend diameter: 127 mm.

Tensile loading: ≥ 89 N.

Tube material: The tube shall be composed of a low halogen, low smoke, low toxicity polymer material.

FINISHED CABLE:

Dimensions and configuration: See figure 2. An outer jacket shall be applied over strength members and a central tube. The minimum outer jacket thickness shall be not less than 1.15 mm.

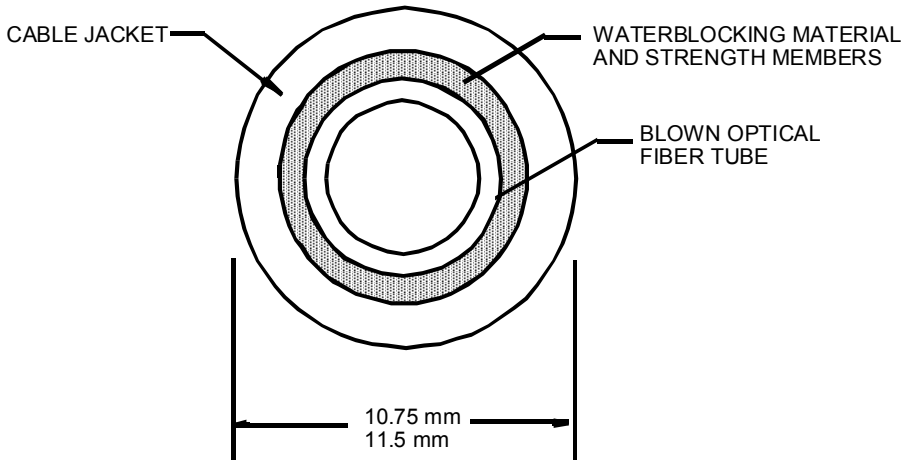

FIGURE 2. Single tube cable.

Concentricity: ≥ 0.65.

Jacket material: The overall jacket shall be composed of a low halogen, low smoke, low toxicity polymer material.

Mass per unit length: ≤ 120.0 kg/km.

Short-term minimum bend diameter: 127 mm. (The short-term minimum bend diameter is to be used in all environmental and mechanical tests that specify a cable minimum bend diameter.)

Long term minimum bend diameter: 127 mm.

PERFORMANCE REQUIREMENTS:

Optical properties:

Attenuation Rate: Not applicable.

Change in optical transmittance: Not applicable.

Crosstalk: Not applicable.

Mechanical properties:

Tensile loading and elongation: Applicable, tensile loading $\geq$ 445 N. Change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube after the test.

Operating tensile loading: Applicable, tensile loading $\geq$ 267 N. Change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube during and after the test.

Dynamic bend: Not applicable.

Low temperature flexibility: Applicable, except the change in optical transmittance is not applicable. For standard performance the exposure temperature shall be the minimum operating temperature. For enhanced performance the exposure temperature shall be $-40^{\circ}C$. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube after the test.

Cyclic flexing: 500 cycles at $+25^{\circ}C \pm 2^{\circ}C$ and 100 cycles at $-28^{\circ}C \pm 2^{\circ}C$. Change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube after every 100 cycles for the 500-cycle exposure and every 25 cycles for the 100-cycle exposure. The cycling may be halted to perform the ball bearing test.

Crush: Applicable, except that the load shall be 950 N and the change in optical transmittance and crosstalk are not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube after the load is removed.

Cable twist bending: Not applicable.

Radial compression: Applicable, except the change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube during and after the test.

Impact: Applicable, except that the drop hammer mass shall be 1.5 kg. 50 cycles shall be conducted at $+25^{\circ}C \pm 2^{\circ}C$ and 20 cycles shall be conducted at $-40^{\circ}C \pm 2^{\circ}C$. The change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube after the test.

Corner bend: Applicable, except the change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube during and after the test.

Hosing: Low pressure: Applicable. Tube ends shall be capped with end caps during this test.

Hydrostatic: Not applicable.

Dripping: Applicable.

Cable scraping resistance: 750 cycles.

Cable to cable abrasion: 500 cycles.

Cable shrinkage: Applicable, except that the total shrinkage shall be not greater than 35 mm.

Pressure withstand: One end of the inner tube shall be capped and a static pressure of 1.4 MPa (200 psi) applied internal to the tube for 10 minutes. After the test, tubes shall show no evidence of splitting, cracking or rupture.

Environmental properties:

Temperature range:

Operating: -28°C to +65°C.
Nonoperating: -40°C to +70°C.
Storage: -40°C to +70°C.

Temperature cycling: Change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube at the high temperature plateau, the low temperature plateau, and after the test.

Thermal shock: Not applicable.

Temperature humidity cycling: Change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube at the high temperature plateau, the low temperature plateau, and after the test.

Storage temperature: Applicable, except the change in optical transmittance is not applicable. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube after the test.

Life aging: Applicable, except the change in optical transmittance is not applicable and a minimum test sample length of 150 m may be used. For standard performance product the test shall be conducted as specified in the basic specification. For enhanced performance product, the test shall be conducted as specified in the basic specification except that the jacket material shall be tested at +175°C for 4 hours. A minimum of 2 m of the sample shall be maintained at the minimum bend diameter throughout the test. A ball bearing with a minimum outer diameter of 4.0 mm shall pass through the tube after the test.

Weathering: Not applicable.

Fluid immersion: Standard performance: Exposure to automobile gasoline and tap water are not required and the test temperature for lubricating oil exposure shall be 73°C to 77°C. The tensile strength retention of the cable jacket material after exposure to hydraulic fluid shall be not less than 30 percent.

Enhanced performance: Exposure to automobile gasoline and tap water are not required and the following test temperatures shall be used for the fluids indicated: fuel oil (98°C to 100°C), turbine fuel (48°C to 50°C) and lubricating oil (98°C to 100°C).

Flame extinguishing: Applicable. Tube ends shall be plugged with a non-flammable sealant to simulate end caps.

Smoke generation and flame propagation: Applicable. Tube ends shall be plugged with a non-flammable sealant to simulate end caps. The pass/fail criteria shall be as follows. The peak optical density and the average optical density of smoke produced shall be not greater than 0.5 and 0.15 respectively. In addition, the flame spread-time product at the 10-minute point shall be not greater than 27.5 meters-minutes when calculated in accordance with ASTM-E-84.

Shock: Applicable.

Paint susceptibility: Applicable.

Chemical properties:

Halogen content: < 0.2 percent.

Cross-link verification: This test is applicable for cables with cross-linked jackets only. The test shall be conducted in accordance with ICEA standard T-28-562 and run at 200°C. The test shall be sequenced after the fluid immersion test in the qualification test sequence and in the group C quality conformance test sequence. The hot creep shall not exceed 100 percent and the hot creep set shall not exceed 10 percent.

Part or Identifying number (PIN):

M85045/26-01S (Standard performance).
M85045/26-01E (Enhanced performance).

Qualification by similarity.

Manufacturers who produce enhanced performance products for both MIL-PRF-85045/25 and this specification sheet, and are qualified under MIL-PRF-85045/25, and whose enhanced performance product passes the visual and mechanical, low temperature flexibility (cold bend), cyclic flexing, crush, impact, life aging (complete cable only), tensile loading and elongation, operating tensile load, low pressure hosing, radial compression, corner bend, cable abrasion resistance, smoke generation and flame propagation, and flame extinguishing inspections specified herein, are qualified under this specification sheet for enhanced performance product, This qualification by similarity is applicable if the same cable jacket and other materials are used in the previously qualified MIL-PRF-85045/25 cable and the enhanced performance cable under test.

Manufacturers who produce standard performance products for both MIL-PRF-85045/25 and this specification sheet, and are qualified under MIL-PRF-85045/25, and whose standard performance product passes the visual and mechanical, low temperature flexibility (cold bend), cyclic flexing, crush, impact, life aging (complete cable only), tensile loading and elongation, operating tensile load, low pressure hosing, radial compression, corner bend, cable abrasion resistance, smoke generation and flame propagation, and flame extinguishing inspections specified herein, are qualified under this specification sheet for standard performance product, This qualification by similarity is applicable if the same cable jacket and other materials are used in the previously qualified MIL-PRF-85045/25 cable and the standard performance cable under test.

Custodians:
Army - CR
Navy - SH
Air Force - 11
NASA - NA

Preparing activity:
Navy - SH

Review activities:
Army - AR, AV, MI
Navy - EC, YD
Air Force - 02, 19, 80, 99
DLA - CC

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